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GB 1571394 A GB 1570445 A GB 1083886 A
GB 0967342 A GB 0910056 A

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ONLINE DATABASES: WPI and CLAIMS

(54) Radiant heat shield

(57) A heat shield for protection against radiant heat, comprises a supported metal sheet with a profiled cross-section. Typically the heat shield may comprise two profiled sheets (10, 11), each of expanded metal, supported in parallel planes where the cross-sectional profiles of the two sheets are in each case a succession of angular flat peaks alternating with angular flat channels, the channel depth and the pitch between channels being different between the two sheets. The shields may be used on oil or gas installations to protect personnel from heat sources such as gas flares.

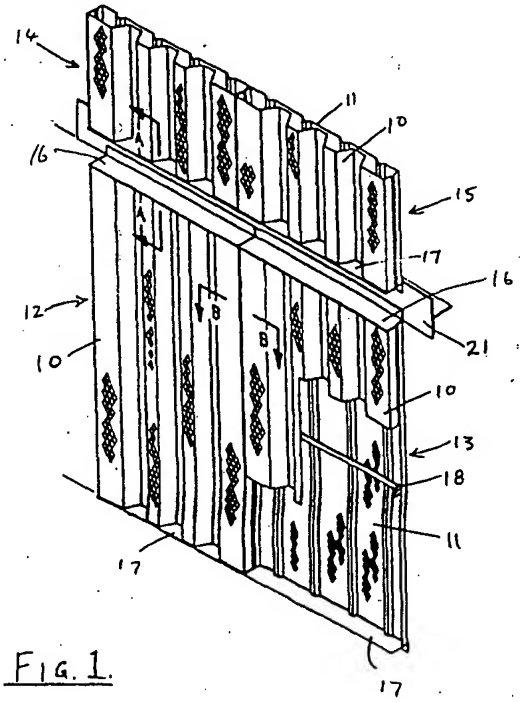

FIG. 1.

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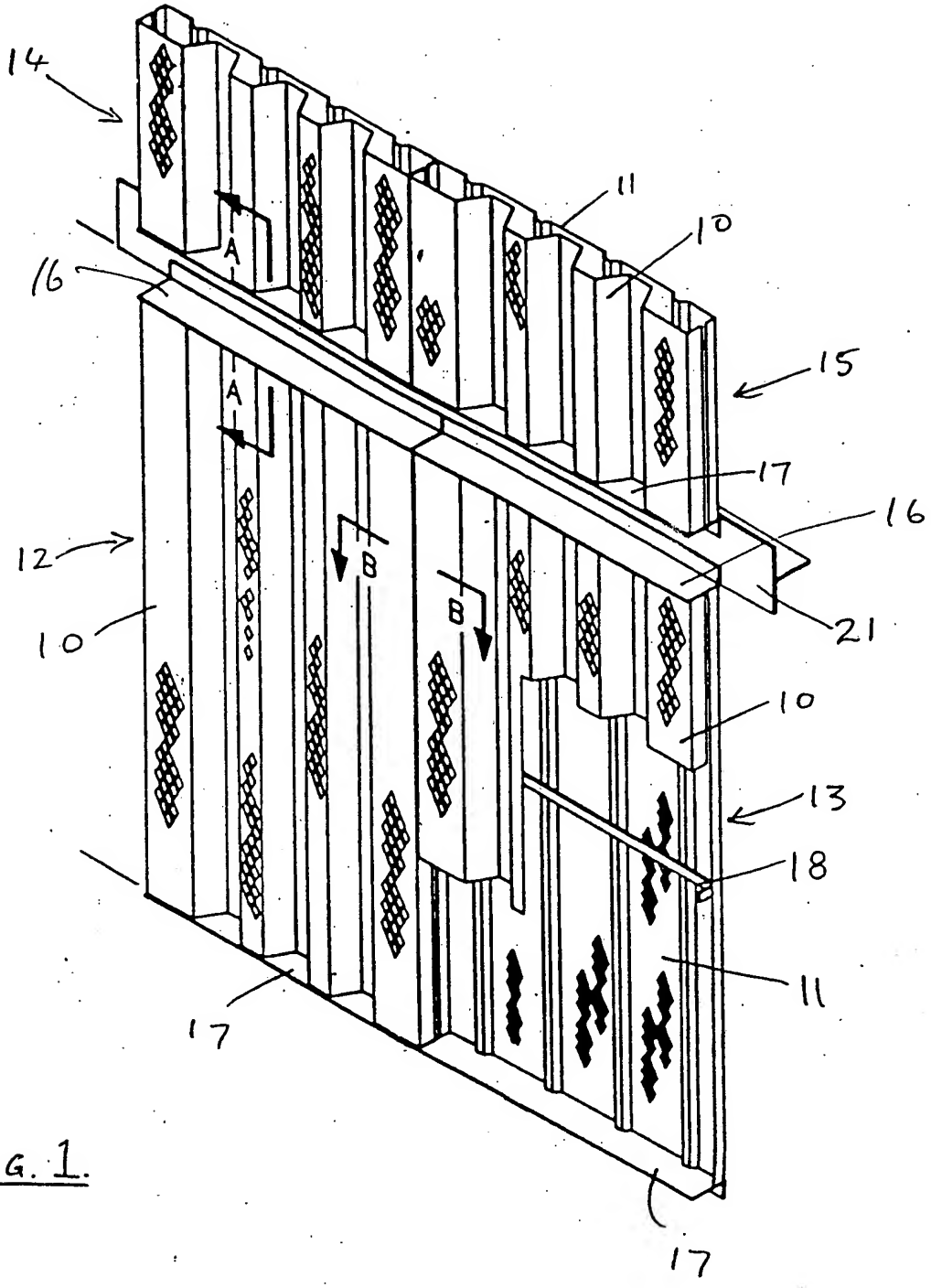

FIG. 1.

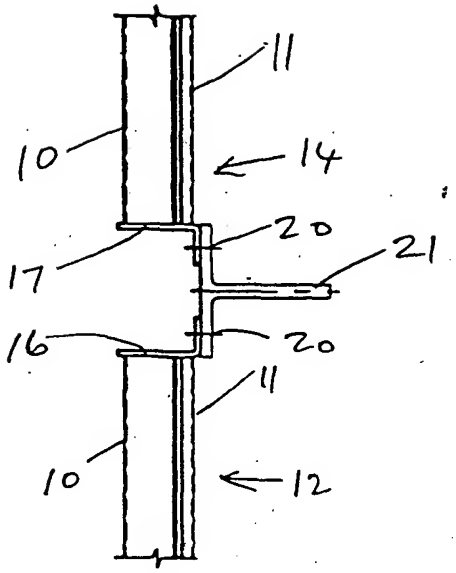

FIG. 2.

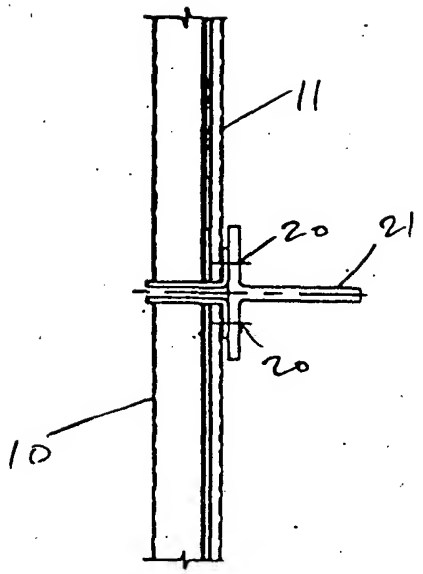

FIG. 3.

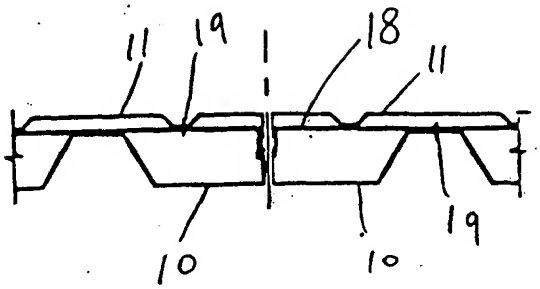

FIG. 4.

Radiant Heat Shield.

The present invention is a heat shield devised to afford protection against radiant heat. Its use is typified by, but not limited to, the provision of a shield between a flare of burning gas on an oil- or gas-rig and an area generally accessible to staff on the rig.

The need for protection against radiant heat for personnel and equipment is a familiar need to the off-shore industry. Gas produced on an off-shore oil production rig, by way of example, may be disposed of by burning in the form of a continuous flare, in which standing temperatures of several hundred degrees Celsius arise. However space and distances are, of course, severely limited on off-shore rigs and

therefore, although such flares are usually placed at the outer end of a boom extending from the rig, it is not possible to place a sufficient distance between a flare and personnel on the rig to isolate such personnel from exposure to the discomforts and dangers of radiant heat generated by the flare.

In order to protect rig personnel and equipment from radiant heat from this source it is therefore usual to mount some form of heat shield upon the rig between the flare and those areas of the rig to which personnel require access. Such heat shields may be solid metal plates. While solid sheets of this type may afford very good protection, they tend to be heavy and therefore undesirable on rigs, where weight considerations are very important. For that reason, it has been proposed to construct radiant heat shields of sheets of metal in the form of a mesh or other perforated structure. In this way, the weight of the heat shield may be significantly reduced, although some reduction in the shielding properties of the heat shield is also incurred. Partly to offset this reduction and partly to protect

personnel against contact with the mesh sheet, it has been proposed to add one or more additional mesh sheets, either in contact with the first sheet or spaced from it by a small distance. Of course such additional sheets and the support structure for such sheets add to the overall weight of the heat shield.

Against this background, it is an object of the present invention to provide an improved form of radiant heat shield, by means of which a high degree of protection against radiant heat may be afforded, while avoiding some at least of the disadvantages of prior such shields.

The radiant heat shield according to the present invention comprises a supported metal sheet of perforated material, having a profiled cross-section.

It has surprisingly been found that the adoption of a profiled perforated metal sheet to form the structure of a radiant heat shield conveys important advantages to the shield. Among other such advantages, the profiled sheet has a greater total surface area than a flat sheet of the same overall dimensions and therefore more effectively

dissipates radiant heat incident upon its surface. In addition, because at least some areas of the profiled surface are inclined to the direction of incidence of the radiant heat, the incident heat is more effectively reflected and therefore better dissipated. A further advantage is that the profiling of the sheet adds rigidity to the structure and thereby reduces the degree of support required, which in turns makes the structure lighter and cheaper than that of a flat perforated sheet.

While the heat shield according to the present invention has been devised with the above-mentioned object in mind, that is as an improved form of protection against radiant heat, it may also be used as a protection against the adverse weather conditions typically encountered in off-shore locations.

In its simplest form, the improved radiant heat shield according to the invention is just a single profiled sheet thick. However the foregoing advantages are greatly enhanced by providing two such profiled sheets, mounted in parallel planes. Thus a much preferr d form of the heat shield

according to the inv ntion comprises two metal sheets of perforated material, mounted in parallel planes, each sheet having a profiled cross-section. An additional advantage of a second sheet is that there is a marked drop in temperature between the outer sheet (that is, the sheet which is nearer to the radiant heat source) and the inner sheet. Personnel are therefore protected by the inner sheet from burning their hands on contact with the heat shield, up to a much higher source temperature than when a single sheet is used.

The perforated metal material of which the or each sheet is constructed may take various forms. It may, for example, be a piece of plain sheet material, which has been perforated with a number of holes before, or possibly after, it has been profiled. However a much preferred form of the sheet is constructed from an expanded metal, or less preferably from a wire mesh material.

The cross-sectional profile of the sheet or of each sheet may be angular or smoothly curved. In the form of the invention comprising two or more parallel profiled sheets, the profiles of the sheets may be the

same or different and may be in register with each other or relatively displaced. Preferably the cross-sectional profile consists of an undulating succession of flat or rounded peaks and channels, for example a sinusoidal profile or a corresponding angular shape. In a particularly preferred form of the invention, the shield comprises two sheets of different angular cross-section.

When the radiant heat shield comprises two profiled sheets, the sheets are mounted in parallel planes. They may be mounted in mutual contact but preferably are spaced apart by a small distance and thereby define a narrow air space between them, which may be selected to meet the intended conditions of use of the shield.

The heat shield may be formed as a self-supporting unit, for example with a peripheral frame and/or supporting cross-bars, or may be assembled in situ at its intended point of use, for example on an oil exploration or production rig before or after the rig is transported to the site where it is to be operated.

Especially when the shield is to be used in off-shore or other exposed locations, the sh ets ar preferably of stainless steel.

The invention also includes a method of protecting personnel against radiant heat, comprising interposing a radiant heat shield according to the present invention between the radiant heat source and an area to which the personnel have access.

The invention further includes an oil or gas installation having flare means for burning gas and having a radiant heat shield according to the invention mounted between the flare means and an area to which personnel have access.

The invention will now be further described with reference to the accompanying drawings, which illustrate, by way of example only, one preferred form of the radiant heat shield according to the invention and wherein:-

Fig.1 is a cut-away perspective view of two panels of the heat shield, showing parts of two adjacent panels;

Fig.2 is a cross-sectional view in the direction A-A of Fig.1;

Fig.3 is a further cross-sectional view, showing an alternative structure to that of Fig.2; and

Fig.4 is a cross-sectional view in the direction B-B of Fig.1.

The illustrated heat shield is shown, in Fig.1, as four panels 12 to 15. Each panel comprises a first profiled sheet 10 of expanded metal mounted parallel to a second profiled sheet 11, also of expanded metal. The cross-sectional profiles of the two sheets, as seen to good effect in Fig.4, are in each case a succession of angular flat peaks alternating with angular flat channels, the channel depth and the pitch between channels being different between the two sheets.

The two sheets in each of the panels are supported at their upper and lower ends upon steel sections 16 and 17 respectively. The sheets are held by these steel sections in closely-spaced parallel relationship and are further supported and spaced by bridging flats 18, disposed at an intermediate position between the ends of the sheets and to which the sh ets are secured by pop rivets 19.

In the illustrated embodiment the first profiled sheet 10 was shaped from the expanded metal product sold by Expamet Limited under the Type Reference 1189SF and the sheet 11 was shaped from a second expanded metal product sold by that company under the Type Reference N6664F.

Figs. 2 and 3 show alternative methods of mounting adjacent panels 12 and 14 or 13 and 15. In the Fig.2 construction, the parallel adjacent edges of the panels are mounted by means of bolts 20 upon a steel T-section 21, with a small horizontal gap between the panels. In the alternative construction shown in Fig.3, the gap between the panels is reduced to a minimum value, typically of the order of 5 mm.

In confidential tests of the illustrated heat shield under controlled experimental conditions, the shield was shown to reduce incident radiant heat by an amount in excess of 80 per cent across the thickness of the shield. When the heat level was measured at a distance of 500mm behind the shield, the reduction in radiant heat amounted to in excess of 90 per cent.

In each case, the more deeply profiled sheet 10 was directed towards the radiant heat source.

CLAIMS

1. A radiant heat shield comprising a supported metal sheet of perforated material, having a profiled cross-section.

2. A radiant heat shield as claimed in Claim 1, wherein said material is a sheet material which has been perforated with a number of holes before or after it has been profiled.

3. A radiant heat shield as claimed in Claim 1, wherein the sheet material is an expanded metal.

4. A radiant heat shield as claimed in Claim 1, wherein the sheet material is a wire mesh.

5. A radiant heat shield as claimed in any of the preceding claims, wherein the profile of said sheet consists of an undulating succession of flat or rounded peaks and channels.

6. A radiant heat shield as claimed in Claim 5, wherein said profil is angular.

7. A radiant heat shield as claimed in any of Claims 1 to 6, comprising two said profiled sheets mounted in parallel planes.

8. A radiant heat shield as claimed in Claim 7, wherein said two profiled sheets are of different angular cross-section.

9. A radiant heat shield as claimed in either of Claims 7 and 8, wherein said two profiled sheets are spaced apart by a small distance.

10. A radiant heat shield as claimed in any of the preceding claims, formed as a self-supporting unit with a peripheral frame and/or supporting cross-bars.

11. A radiant heat shield as claimed in any of the preceding claims, wherein said metal is stainless steel.

12. A radiant heat shield substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

13. A method of protecting personnel against radiant heat, comprising interposing a heat shield as claimed in any of the preceding claims between the radiant heat source and an area to which the personnel have access.

14. An oil or gas installation having flare means for burning gas and having a radiant heat shield as claimed in any of Claims 1 to 12 mounted between the flare means and an area to which personnel have access.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9406004.3
Relevant Technical Fields (i) UK Cl (Ed.M) A5A (A37); E1D (DF113) (ii) Int Cl (Ed.5) A62C 2/06, A62C 8/08, E21B 35/00	Search Examiner M R WENDT Date of completion of Search 10 JUNE 1994
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE DATABASES: WPI AND CLAIMS	Documents considered relevant following a search in respect of Claims :- 1-14

Categories of documents

X:	Document indicating lack of novelty or of inventive step.	P:	Document published on or after the declared priority date but before the filing date of the present application.
Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	E:	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
A	GB 1571394	(LOCKER) See Claim 1, Figure 1	1, 4, 14
X	GB 1570445	(LUCHAIRE) See page 1 lines 22-38, page 2 lines 5-27, Claim 1, Figures	1, 2, 7, 9
X	GB 1083886	(UNION CARBIDE) See page 2 lines 27-34, Claim 1, Figures 2 and 3	1, 2, 7, 9
A	GB 967342	(DARCHEM) See Figure 1, Claim 1	1
X	GB 910056	(STANRAY) See Figure 4, Claim 1, page 3 lines 117 etc, page 2 lines 78-81	1, 2, 4

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